ANALYSIS OF FOSSILIZED ERRORS IN SPEECH PRODUCTION

OF ADULT IGBO-ENGLISH BILINGUALS

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ABSTRACT

The study analyzed a sample of the interlanguage (speech production) of Igbo English bilinguals to determine manifestation of fossilized errors induced by the target sounds /Λ, Ɵ, and æ/. Data were generated from a passage and a model containing the target sounds given to 10 randomly selected staff of the Federal Medical Centre, Umuahia who had their training in English language. Data were analyzed using spearman's correlation coefficient statistical method, and mean value of the correct and fossilized errors. The findings revealed high mean value of fossilized errors for the target sounds which are lacking in the participants' native language (NL) phonemic inventory /Λ, and Ɵ/ with a low mean valueof fossilized errors for the target sound present in the participants' NL phonemic inventory/æ/. Spearman's correlation coefficient adopted for analysis gave us a value of -1. The study concluded that linguistic items present in the target language but absent in the learners' native language are probable mistake causers which, if not got rid of, with positive input, before the learners attain their plateaus in IL, would possibly become fossilized items.This study further appear to establish a negative correlation between amount of fossilization and learners' NLand recommended strategies tobe adopted to facilitate learning before learners reach their plateau in IL because permanent defossilization may not be possible after critical period.

KEYWORDS: Fossilization, Stabilization, Critical Period

Original Article

INTRODUCTION

Second language acquisition (SLA) researchers and analysts have used error analysis (EA) and interlanguage (IL) to investigate processes involved in second language learning.The most obvious approach to analyzing interlanguage, according to Brown (2007) is to study the speech and writing of learners through which ''errors can be observed and classified to reveal something of the system operating within the learner'' (Brown, 2000, p. 218). This implies that errors are a natural part of learning and should not be seen as misnomer. Errors are ''red flags'' that provide evidence of the learner's knowledge of the second language (Gass&Selinker, 1994).Proponents of Competition model (MacWhinney& Bates, 1989) observed that L2 learning begins with massive transfer. Massive transfer of L1 features to the target language especially when there are established structural differences between L1 and target language (TL) lead to errors in the target language while transfer when there are similarities between them facilitate rapid and easy learning (Elis, 1985) The learner, after an initial massive transfer, later discovers that his output does not match the target language. The learner will never detect a mismatch between his own forms and the correct target forms if the target forms are passed through an L1 filter (MacWhinney, 1978; MacWhinney& Bates, 1989). If the learner is unable to detect an error between his output and

the correct target forms, what MacWhinney (1978) calls L2 auto-associative network will notbe developed. L2 learner must be encouraged to detect the difference between his output and the correct target forms if he must develop auto-associative network. This can be achieved easily through computer enhanced speech processing (MacWhinney, 1990).

When a learner fails to develop auto-associative network, errors tend to insistently manifest in the interlanguage. The developmental nature of interlanguage reveals that L2 learners go through a process of making and testing hypothesis about the target language (Selinker, 1972), a process which according to Jalali&Shojaei (2012) leads to internalizing the L2 rules. Successful hypotheses become mental constructions that correspond to the rules of the target language while unsuccessful hypotheses are revised or discarded (Wang, 2008). This implies that L2 learners at every moment are located on aninterlanguage (IL) continuum between their L1 and the target language. The high level of competence in the target language is attained by highly successful L2 learners while less successful L2 learners become fossilized somewhere along the IL continuum (Brown, 1994).

The term *fossilization*, first introduced by Selinker (1972),refers to ''the long term persistence of non-target-like structures in the interlanguage of the non-native speakers'' (Selinker&Lakshmanan, 1992, p.197).Han (2003) defined fossilization from both cognitive and empirical perspectives. Fossilization, according to him ''involves those cognitive processes, or underlying mechanisms that produce permanently stabilized interlanguage forms that remain in learner speech or writing over time, no matter what the input or what the learner does''(p.99)When errors are permanently found in the IL of an L2 learner in a form that is deviant from the TL norms and that continues to appear in performance regardless of further exposure to the TL, it is referred to as fossilized errors (Selinker&Lakshamanan, 1992). In addition to the term fossilization, Selinker and Lakshamanan (1992) introduced the term stabilization. Stabilization, according to them presumes fossilization. The difference between the two is defined in terms of permanence. Stabilized errors are not permanent, rather they are, at a given level of IL development, maintained in L2 learner's production. Teachers and L2 learners however, have roles to play at this stage of IL development to ensure stabilized errors disappear since stabilization is a prelude to fossilization. Fossilized errors, on the other hand, are permanently established in the IL of an L2 learner (Nozadze, 2012) in the form that is deviant from the TL norms and persists in his performance irrespective of TL exposure. Fossilization is the result of acquisition while stabilization is the result of language learning (Cui-lian, 2003).Fossilization manifests at all levels of language study but records proved evidence of incessant occurrences at the phonological level (Selinker, 1972). Selinker asserts that once second language learners have passed the critical period, their pronunciation becomes inevitably fossilized.

Second language teachers and researchers have enumerated various causal factors of fossilization ranging from lack of corrective feedback, L1 interference, inadequate or impoverished quantity or quality of target language input, method of instruction (too much based on the native language), L2 learners' communicative competence such as avoidance and simplification, inattention to improving L2 proficiency, lack of learner autonomy,etc (Richard, 1986;Wang, 2011;Nozadze, 2012).The review of the concept of fossilization above shows that it isa process of cessation of learning, a point of no further growth of learningno matter what the age of the learner or the amount of explanation and instruction s/he receives in the TL.

Ricard (1986) however, developed a course on phonology and pronunciation for Advanced Language Training Programme of the Canadian government and demonstrated that steps can be taken to improve fossilized pronunciation in adult students.

Brown's (1994) study, a follow up of Vigil and Oller's (1979) 'account of fossilization as a factor of positive and negative affective and cognitive feedback' claimed that fossilization is a reversible condition if ''the learner is given the necessary positive feedback meant to encourage further attempts at communication''(p. 218)

Demirezen (2005) alsodemonstrated through a study he conducted with Turkish English bilinguals, using controlled guided pronunciation practice called the *audio-articulation method*, that it is possible to rehabilitate fossilized pronunciation errors brought about by the contrast of /ow/ and /ɔ,ɔ:/ phoneme of the American English.

Dolezelova (2008) mapped fossilized pronunciation errors of Advanced Czech speakers of English to analyze and uncover those fossilized errors that prevent Czech bilinguals from sounding native-like and found that although there are still pronunciation errors in advanced Czech bilinguals, they are limited to small numbers of consonants, what proved to be a significant error was the devoicing of final /z/ in plural and third person singular in present simple of verbs as well reduction of vowels in unstressed syllables. Dolezelova's work supported the existence of fossilized pronunciation errors in Czech bilinguals necessitated by contrast of /s/ and /z/ as well as the neutralization of lenis/fortis distinction in final lenis consonant.

Jalali & Sojaei (2012) examined Persian EFL students' developmental versus fossilized errors and recorded that out of the fifteen prepositional error types identified in the subjects' compositions, two were identified as developmental and thirteen as fossilized errors, evidence that fossilization is at play in foreign language learning and demands serious attention for learners to overcome.Fossilization, from the conceptual works reviewed above is a process, a cognitive mechanism, or as a result of learning andit is marked as an obstacle in the process of second and foreign language teaching and learning. The empirical studies reviewed aboveoffered steps necessary for rehabilitation of fossilized pronunciation errors. If we believe the positive effect of models and plans (Audio Articulation Method, for example) on fossilized errors of EFL and ESL, how permanent can these cured pronunciation habits remain in second language learners?.Kayaoglu&Caylak (2013) for instance, recorded a study where Turkish students' pronunciation errors on inter-dental fricatives were cured but subsequently, classroom data reviewed that the students were not able to maintain their newly acquired pronunciation habits.Following the argument above, it is established that in addition to the amount and type of instruction L2 are exposed to, students' age, attitude and concern for good pronunciation (Kenworthy, 1987) should be taken into cognizance in any true account of pronunciation studies. Some scholars have proved that once language learners have passed the critical period, ''a biologically determined period of life when language can be acquired more easily and beyond which time language is increasingly difficult to acquire''(Brown 2007, p.57), their pronunciation becomes inevitably fossilized (Selinker, 1972). This assertion is supported by the extreme but widely accepted Kissenger effect (a German-born American political scientist who had good and fluent command of English language but had a German accent while speaking English). Following this argument, permanent defossilization is age dependent. Most of the studies on fossilized pronunciation errors aimed at assessing the curability of such errors, few if any could empiricallypresent, with corpus, the manifestation of the fossilized pronunciation errors relating them to either contrasts in the learner's native and the target language or other factors.The objective of this work therefore, is to investigate, identify and analyze the causes and the extent of the manifestation of fossilized pronunciation errors in the speech production of Igbo English bilinguals induced by the pronunciation of /ʌ/, /Ө/and /æ/. The study will ascertain, through the negative evidence, if there is a correlation between the amount of fossilization and the degree of L1 influence through the production of the target sounds. Among the levels of language study, pronunciation is considered as 'a highly and mostly neglected issue' (Saran, Seferogu

& Calgiltay, 2009, p. 97) but the most difficult area both for foreign language teachers and learners and become easily fossilized in the IL (Demirezeen, 2005). Bearing this mind, a work of this nature is a welcome development.

METHODS

The population of this study is drawn from workers of Federal Medical Centre, Umuahia. A total of ten (10) Igbo English bilinguals were randomly selected. These subjects fall within the age range of 25 to 48 years. They are holders of at least, Ordinary National Diploma, with others as holders of first degree, and MastersDegree. They all had their training in English where they had Use of English as a mandatory course of study. The choice of these subjects is informed by the fact they have reached their IL plateau, which according to Gass&Selinker (2001), is far from the TL norms. What formed data for analysis is the speech production of these ten (10) Igbo bilinguals.Igbo is a language that belongs to Benue Congo family of the Niger Kordofanian of African languages. It is spoken by people who are located in the Southeast part of Nigeria and some parts of Delta and Rivers States with a population of approximately 12 million people. The researchers recorded their speech production in long and short discussions and developed passages containing the target sounds for them to read. The subjects' reading production was recorded to elicit the frequencies of occurrences of the fossilized and correct sounds and their percentages.Spearman's correlation coefficient statistical method was adopted to analyze the data to test relationship between fossilization and native language influence. The mean value of all fossilized sounds and their correct forms was further established. In addition to the passage given to the subjects, the researcher produced a modelbased on those target sounds for the subjects to read as follows:

Model 1

Come up

Come up mom

Come up mom, pick up the cup

Come up mom, pick up the cup and run after the bus

Crush the mudguard

Crush the muffled mudguard

Crush the dumped muffled mudguard

Huddle up

Huddle up humble hunters

Huddle up humble hungry hunters

Dump the rug

Dump the rug, I have had much of that stuff

Dump the rug, I have had much of that stuff in a hurry.

Shun the shuttle

Shun the rubbish shuttle

Shun the uncle's rubbish shuttle

Shun the uncle's crushed rubbish shuttle.

Model 2

Three thieves

Three thieves threshed grains

Three thieves thoroughly threshed grains

Three thieves threaten to thoroughly thresh the grains.

Worthless throttle

Worthless throttle thrust their way through

Worthless throttle thrust their way through thin outlet

Faith relayed the truth

Faith relayed the truth through three different media

Faith relayed the truth through three different media on Thursday

Faith relayed the truth through three different media on first Thursday of the month.

Thick thin thigh

Thick thin thigh due for therapeutic treatment

Thick thin thigh due for thorough therapeutic surgery

Both things

Both earthly things amount to nothing

Both earthly things thoughtfully amount to nothing

The participants were given in all three hundred (300) words containing the target sounds.

We adopted Received Pronunciation (RP)as the chosen pronunciation model for analysis becauseit is the accent on which phonetic transcriptions in dictionaries are based and the model used for teaching English as a foreign language. Following Hewings (2004, p. 11), ''there are as many ways of pronouncing English as there are English speakers''.

The data generatedwere transcribed and mapped onto correct forms to identify deviant formscaused bypronunciationof the target sounds /Λ/,/Ɵ/ and/æ/. The English vowel and consonant phonemes''cup'' /Λ/ and ''thought'' /Ɵ/ are crucial articulation problems for Igbo teachers and learners.They articulate /Λ/ as /ɔ or ɔ:/. The English labio-dental fricative /Ɵ/ is articulated as /t/. These kind of articulation problems do not only harm communication competence of Igbo-English bilinguals, teachers, and teacher trainees but can lead to misinterpretation of information or interaction problems especially when it involves speakers of other languages or cultures. The data available in this study will enable us to test whether fossilization is independent of native language influence or whether fossilization depends or is influenced by native language.

FINDINGS

The statistical table below reveals correlation between fossilized error and correct pronunciation of /Λ/

Table 1

Participants	Correct (x)	Error (y)	Rx	Ry	di =(Rx –Ry)	di^2
1	12	88	5	6	-1	1
2	11	89	4	7	-3	9
3	10	90	2.5	8.5	-6	36
4	27	73	10	1	9	81
5	21	79	9	2	7	49
6	15	85	8	3	5	25
7	14	86	7	4	3	9
8	13	87	6	5	1	1
9	9	91	1	10	-9	81
10	10	90	2.5	8.5	-6	36
					Total	**328**

Rx = ranking of correct pronunciation

Ry = ranking of fossilized errors in pronunciation

Using spearman's rank correlation coefficient, the rule is that the value of correlation coefficient ranges from -1 to 1. If the value is -1, it implies that there is a negative relationship, that is, as error is going up, the correct pronunciation is coming down. If the value is +1, there is a positive relationship, meaning that both fossilized error and correct pronunciation will be going up together. If the value, on the other hand is 0, there is no relationship between error and correct pronunciation.

r = 1   - 6Σdi

n (n^2 -1)

= 1 - 6x328   = 1 - 328

10(10^2 – 1)   10(100 - 1)

 = 1 -6 x 328   = 1 - 328 x 6

10 x 99   990

1 – 1.9879 = - 0. 987

$$= \quad -1$$

Statisitcal table showing correlation between fossilized error and correct pronunciation of /Ө/

Table 2

Participants	Correct (x)	Error (y)	Rx	Ry	d =(Rx – Ry)	di²
1	48	52	10	1	9	81
2	41	59	9	2	7	49
3	35	65	6	4	2	4
4	38	68	8	5	3	9
5	29	71	5	6	-1	1
6	11	89	1	10	-9	81
7	15	85	3	8	-5	25
8	12	88	2	9	-7	49
9	27	83	4	7	-3	9
10	36	64	7	3	4	16
					Total	**324**

r = 1 - 6Σdi²

n (n²-1)

= 1- 6 x 324

10 (10² -1)

=1 – 1944

990

= 1 – 1.9636

= -0. 964

r = -1

Statisitcal table showing correlation between fossilized error and correct pronunciation of /æ/

Table 3

Participants	Correct (x)	Error (y)	Rx	Ry	di=(Rx –Ry)	di²
1	98	2	5	6	-1	1
2	100	0	9.5	1.5	8	64
3	95	5	1	10	-9	81
4	97	3	2.5	8.5	-6	36
5	99	1	7.5	3.5	4	16
6	98	2	5	6	-1	1
7	97	3	2.5	8.5	-6	36
8	100	0	9.5	1.5	8	64
9	99	1	7.5	3.5	4	16
10	98	2	5	6	-1	1
					Total	**316**

R = 1 - $\frac{6\Sigma di^2}{n(n^2-1)}$

= 1 - $\frac{6x\ 316}{10(10^2-1)}$

= 1 – $\frac{6\ x\ 316}{10\ x\ 99}$

= 1 - $\frac{1896}{990}$

= 1 – 1.9152   = - 0. 9152

= - 1

Following from Tables 1 -3 above, the value of Spearman's rank correlation coefficient is -1 in all of them, implying that there is negative relationship between amount of fossilization and native language influence. Tables 1 and 2 recorded high errors than the correct forms while Table 3 recorded high correct forms than errors.

The statistical table below reveals the mean value of correct and fossilized errors

Table 4

Form	/Λ/	/Ө/	/æ/	Total
Ave. Correct value (ACV)	12.40	27.32	98.56	138.28
Ave. Error value (AEV)	87.60	72.68	1.44	161.72
Total Value (TV)	100	100	100	300

According to table 4 above, fossilized error of /Λ/has the highest mean valuewith 87. 60, and the mean value of the correct pronunciation is 12.40. The following typical errors of /Λ/ sound manifest in the data:

Table 5

Base	Corpus	Correct Form	Fossilized Sound
Come	/kɔ:m/	/kΛm/	/Λ/
Up	/ɔ:p/	/Λp/	/Λ/
Cup	/kɔ:p/	/kΛp/	/Λ/
Huddle	/hɒdl/	/hΛdl/	/Λ/
Hunter	/hɒntæ/	/hΛntə/	/Λ/
Uncle	/ɒŋkl/	/Λŋkl/	/Λ/
Reduction	/ridɔ:kʃn/	ridΛkʃn	/Λ/
Rubbish	/rɔ:biʃ/	/rΛbiʃ/	/Λ/

Table 5 shows that the participants wrongly pronounced the sound /Λ/ as /ɔ:/ or /ɒ/.

/Λ/ is an open mid-back unrounded vowel phoneme and one of the core sounds in English that constitute prime fossilized continuum for Igbo bilinguals. Table 5 further shows that /Λ/ is a fossilized mistake causer for the participants (Igbo bilinguals) who wrongly pronounce it as /ɔ/ necessitated by its absence in Igbo phonemic entry.

The mean value of error of pronunciation of /Ɵ/ ranks 72.68 following **Table 4,** with the mean value of the correct pronunciation ranking 27. 32.

The table below shows typical examples of the pronunciation of /Ɵ/ by the participants.

Table 6

Faith	/feit/	/feiƟ/	/Ɵ/
Thanks	Tæŋks/	/Ɵæŋks	/Ɵ/
Both	/bəut/	/bəuƟ/	/Ɵ/
Earthly	/etli/	/ʒ:Ɵli/	/Ɵ/
Nothing	/nɒtiŋ/	/nΛƟiŋ/	/Ɵ/
Through	/tru:/	/Ɵru:/	/Ɵ/
Thursday	/tɒzdei/	/Ɵʒ:zdi/	/Ɵ/
Thick	/tik/	/Ɵik/	/Ɵ/
Thieves	/ti:vz/	Ɵi:vz/	/Ɵ/

Table 6 above shows that the participants wrongly pronounced the interdental fricative/Ɵ/ as /t/ (voiceless alveolar sound).

Table 4 further shows that fossilized error of /æ/ has a mean value of 1.44 with the correct pronunciation of it ranking 98. 56. The results evidenced that the participants were more successful in pronouncing /æ/ than /Λ/ and /Ɵ/. Error of pronunciation of /æ/ has a mean value of as little as 1.44 because Igbo phonemic entry has such input. /æ/ is not a mistake causer to Igbo participants, consequently any appeal to prior linguistic knowledge in the use of this sound will be facilitative and not inhibitive. Typical examples of manifestation of /æ/ in the data include:

Table 7

Base	Corpus	Correct Form	Fossilized Sound
Fan	fæn	Fæn	-
Language	læŋguedz	Lanŋguedz	-
Palate	pæleit	Pæleit	-
Consonants	kənsəunænts	kənsəunænts	-

DISCUSSIONS

Following from Table 1, the results revealed that fossilization of the target sounds is high when the participants' NL phonemic entry has no such input. The mean value of the errors of pronunciation of /Λ/ and /Ɵ/ recorded the highest value (87. 60 and 72.68) and were replaced by other sounds found in the participants' phonemic inventory, that is, /ɒ or ɔ:/ and /t/ respectively, evidenced that these sounds have been fossilized. It must be remarked that the participants have reached plateau in the development of L2 learners' phonological competence, that is, they have all graduated from their courses of study and are all workers. Following Nozadze (2012), repeated phonological errors are often demonstrations of phonological competence fossilization. Mapped onto Prator's (1967) hierarchy of difficulty, this fossilized error belong to Level 4 (over differentiation) of the hierarchy of difficulty, a case where linguistic items found in the target language are not present in the native language of the learners. Such items, according to Demizerem (2007) constitute fossilized mistake causer for target language learners.

This finding is supported by Demizerem's(2007) and Kahraman's (2012) studies on fossilized pronunciation of Turkish teacher trainees and EFL teachers respectively. Their findings revealed that /Λ/vowel phoneme is a fossilized

mistake causer and constitutes articulation problems for Turkish teachers and learners who learn the target language (English) after critical age period either because of its absence in the learners' native language phonemic inventory.

It is also observed that the participants were very successful in pronouncing /æ/ than the other target sounds, recording a mean value of correct pronunciation of 98.56, with fossilized pronunciation error of mean value of 1.44. This is because the participants' native language has /æ/ vowel phoneme in its phonemic inventory. Mapped onto Prator's (1969) hierarchy of difficulty, this item belong to 0 level (transfer) of hierarchy of difficulty, the participants positively transferred the sound /æ/ found in their NL to the target language, hence leaving little or no fossilization. Such item is not a mistake causer to Igbo English bilinguals.

Table's 1-4 further show that there is a correlation between amount of fossilization and native language influence, in that case, fossilization is not independent of native language influence.

Cui-lian (2003) offered practical measures we can adopt to fight fossilized errors in an effective way, which include, discovering and classifying why and how errors occur.To Igbo bilinguals for instance, identifying that the language lacks /ʌ/ and /ɵ/, and focusing on those error causers, using more drills to form correct and strong skills before the learners attain plateau in IL will, in no little measure prevent fossilization.Error of pronunciation of /ʌ/ and /ɵ/ has remained persistent over time in the IL of these Igbo Englishbilinguals and became fossilized in spite of pedagogic intervention.

The result appear to establish that fossilization is not independent of native language influence, that is, the distinct the target language items are to the learners' native language, the higher the amount of fossilization. This finding is supported by Han's (1998) study of fossilization among advanced L2 learners. His findings affirmed that the learner's ability to get rid of transfer decides the amount of fossilization the learner's IL will show.

CONCLUSIONS

We conclude, in this study, that linguistic items present in the target language but absent in the learners' native language are probable mistake causers which, if not got rid of, with positive input, before the learners attain their plateaus in IL, would possibly become fossilized items, given the data in this study. This study further appear to establish a negative correlation between amount of fossilization and learners' NL. Consequently, since IL plateaus are far from the TL norms (Gass&Selinker, 2001), permanent defossilization appear not to be possible after critical period.

IMPLICATION OF THE STUDY

The above conclusion implies that if needs analysis of the learners are not established, strategies and approaches adopted to facilitate learning in order to develop language competence strategies among learners without stopping, fossilization can be induced by crosslinguistic influence.

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